



UNIVERSITY OF GONDAR
COLLEGE OF MEDICINE AND
HEALTH SCIENCES, INSTITUTE OF PUBLIC HEALTH

DETERMINANTS OF NON-ADHERENCE TO ANTIRETROVIRAL THERAPY
AMONG HIV- INFECTED ADULTS IN AKSUM TOWN HEALTH FACILITIES,
TIGRAY REGIONAL STATE, ETHIOPIA: UNMATCHED CASE – CONTROL STUDY

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LIST OF ACRONYMS AND ABBREVIATIONS

ART	Antiretroviral Therapy
AIDS	Acquired Immune Deficiency Syndrome
AOR	Adjusted Odds Ratio
BMI	Body Mass Index
CD4	Cluster Difference 4
CI	Confidence Interval
COR	Crude Odds Ratio
EPI-INFO	Epidemiological Information
ETB	Ethiopian Birr
HAART	Highly Active Antiretroviral Therapy
HIV	Human immunodeficiency Virus
NGO	Non Governmental Organization
OR	Odds Ratio
PLWHA	People Living With HIV/AIDS
STATA	Statistical Analysis
UNAIDS	United Nations Program on HIV/AIDS
WHO	World Health Organization

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Abstract

Introduction: Poor antiretroviral therapy (ART) adherence can create a dangerous public health problem and limits the effectiveness of human immunodeficiency virus treatment. Since adherence status is dynamic, information is needed to identify site specific determinants of non-adherence to antiretroviral therapy for effective intervention methods.

Objective: The objective of the study was to identify determinants of non-adherence to antiretroviral therapy among adults on ART in Aksum town health facilities

Methods: An Institution based unmatched case control study was conducted from March 20 to May 15/2015 among 411 adult PLWHA (137 cases and 274 controls). Systematic random sampling was used to select controls and all cases were included (cases were rare). Data was collected by both document review and interview via structured and pretested questionnaire. Both bi-variable and multiple logistic regressions were used to compute the statistical test associations by STATA version 12. Variables with p – value < 0.05 were considered as statistically significant.

Results: Sixty nine (58.1%) from non-adherents and 170 (62%) from adherents were males on ART for more than 6 months. More than two years duration on ART (AOR=7 and 95% CI=2.2-22.6), experiencing ART adverse effect (AOR=6.9 and 95% CI=1.4-32.9), substance use (AOR=5.3 and 95% CI=1.4-20.0), living with parents (AOR=3.4 and 95% CI =1.2-10.3), having depression symptom (AOR=3.3 and 95% CI=1.4-7.5), less than 350 cells / mm³ CD4 count (AOR=3.2 and 95% CI=1.8-5.8) and low dietary diversity (AOR=2 and 95% CI=1.1-3.7) were found to be at higher risk of non-adherence .

Conclusion: Long duration on ART, experiencing adverse effect of ART, substance use, living with parents, having depression symptom, low CD4 cell count and low dietary diversity were identified as a risk factors for non-adherence to ART. For those PLWHA who stayed on ART for long duration, health care providers have to give much attention to client's situation on following ART.

Key words: Antiretroviral therapy, case control study, determinant factors, Ethiopia

1. INTRODUCTION

1.1. Statement of the problem

Globally there were 35 million people living with Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS) in 2013. There were an estimated 24.7 million [23.5–26.1 million] people living with HIV in Sub-Saharan Africa, nearly 71% of the global total (1). In Ethiopia In 2013 there were an estimated 793,700(716,300-893,200) people living with HIV/AIDS(2).

Antiretroviral therapy (ART) has played an important role in improving the prognosis and quality of life of HIV/AIDS patients, in reducing the rate of disease progression and death (3). Worldwide almost 12.9 million people were receiving ART at the end of 2013. Only 38% of adults living with HIV had access to ART treatment. Three of four people receiving HIV treatment were living in sub-Saharan Africa. 22 million, or three of five people living with HIV were not accessing ART (1).

Adherence to treatment is critical to obtain full benefits of ART including maximum and durable suppression of viral replication, reduced destruction of CD4 cells, prevention of viral resistance, promotion of immune reconstitution, and slowed disease progression (4). At least 95% adherence is required for ART regimens to be fully effective and to avoid the emergence of resistant strains of the virus (5, 6). Poor ART adherence can create a dangerous public health problem and limit the effectiveness of available HIV treatments (7). However both patients and health care providers face significant challenges with respect to adherence to ART (6).

In 2012, over 9.7 million people living with HIV in low- and middle-income countries were receiving ART (8). However, ensuring adherence to HIV treatment remains challenging in all countries. Adherence is a complex behavior, which is influenced by several determinants (5). A meta-analysis of patients in North America ($n = 17\,573$) and Africa ($n = 12\,116$) estimated that only 55% and 77% in these areas, respectively, achieved over 80% adherence (9). A 2011 meta-analysis, which pooled ART adherence of 33 199 adults in 84 observational studies, reports that only 62% of

individuals took at least 90% of their prescribed ART doses (10). Depending on the drug under study, adherence to ARV varies between 37 to 83 percent (11).

In Ethiopia by the end of June 2013 the number of people ever enrolled in chronic care reached 728,874 while the number ever started ART was 439,301(2) and 343,600 were currently receiving ART(12) . Only 70.3% of individuals who ever started ART were currently on treatment. However, patient loss to follow-up and ensuring adherence to ART regimens remain major challenges of the ART programme (2). Despite free ART services has been one of the greatest achievements and ART programme services have expanded on a large scale, adherence rate were reported below 95% due to different factors associated with non-adherence to ART (5, 13, 14).

In Ethiopia as identified by different studies availability of reminder, alcohol consumption, malnutrition, dietary diversity, CD4 count, depression symptom, adverse effect of ART and duration on ART were factors associated with non-adherence to ART (5, 13, 15-17). Duration on ART in Lao PDR and Nepal: (18, 19) and CD4 count in Southern Ethiopia and systematic review in Cameroon (17, 20) were controversial on their association to ART adherence.

Adherence is not stable. Therefore evidence based information is needed to identify factors associated with non-adherence to ART in the study area.

1.2. Literature review

1.2.1. Socio demographic factors

systematic review in Cameroon showed female gender was found at less probability of being non-adherence (20). But In Nepal and Zambia females non-adherence were found higher than males (19, 21). In southern Ethiopia females were 67.8% less likely at risk of non-adherence to ART than male patients(22).

Systematic review in Cameroon and cross sectional study in India found higher age was associated with decreasing non-adherence level (20, 23). Studies in Nigeria and Kenya showed age, did not associated with non-adherence (24, 25).

In Senegal respondents who were singles tend to complied better adherence than other groups(26). However, in Nepal, Kenya and Ethiopia, no significant association was found between marital status and non-adherence to ART (14, 25, 27).

Study in Lao PDR and Systematic review in Cameroon reported that those who had higher educational level were less non-adherent than that of lower level of education (18, 20). Similarly study conducted in Nepal identified being illiterate was 4.58 times increased likelihood of non-adherence to ART (19).

Meta-analysis included 28 studies involved 8743 HIV-infected individuals from each 14 developing and developed countries showed patients with HIV infections who were employed were 27% less likely non-adherent to ART than those who were unemployed (28).

Those who live far away to treatment centre were more likely to be non-adherent than their counter parts (19). However in Kenya respondents who accessed therapy in clinics within a walking distance were more likely non-adherent than patients who refilled in far away clinics (25).

1.2.2. Psychosocial factors

In southwest and eastern Ethiopia patients who had no family and social support were more likely to be non-adherent to ART as compared to those who get support from their family, religious and social organizations(17, 22).

In Canada individuals living with someone were less non-adherent than compared with those live alone(29). But in Nairobi Kenya, living with family/parents/alone did not show significant association with non-adherence to ART treatment (25).

As study reported in Togo PLWHA who disclosed their HIV status to their sexual partners were less likely to be non-adherent to ART than that of not disclosed their HIV status(30). In Tanzania and Ethiopia, Debreworkos Hospital, participants who disclosed their HIV status were less likely non-adherent to regimens as compared with their counter parts(5, 31).

A meta-analysis in Netherlands and study in South Africa and southwest Ethiopia showed that patients who did not have depressive symptoms had less probability of being non-adherent compared to their counterpart (15, 32-34).

Studies in Nepal, Tanzania and Southern Ethiopia reported that those who drank alcohol were non-adherent to their ART medication than those who did not drink alcohol (17, 19, 31).

1.2.3. Medication related factors

As studies reported in Asian developing countries in 2012 ART drugs have toxicities and adverse side-effects that can facilitate non-adherence(35). Moreover studies in Nepal, northwest Ethiopia reported that those who had ART adverse effects were non-adherent to ART than that of without adverse effects of ART(13, 19).

Those who took ART for a long duration were more non-adherent than those of who staid short period on ART(18). Similarly in Ethiopia (Debreworkos and Yirgalem Hospitals) the respondents' non-adherence rate was inversely proportional to the length of time they had been on ART(5, 22). Findings of prospective study in Asia

and mixed method in Nepal showed that patients who have been on ART for short period (less than two years) were more likely to be non-adherent(19, 36).

In Nepal those who had history of illegal drug use were nearly four times non-adherent than their counter parts (27) . Traditional medicines was also negatively associated with non-adherence to ART in Nigeria(24).

Study in Delhi India revealed that the presence of opportunistic infection was significantly associated with decreasing non-adherence to ART(37). But in south Ethiopia Opportunistic infection did not show significant association with non-adherence to ART (17).

As study reported from south Ethiopia no significant association was found between WHO staging and ART non-adherence (17).

In Nepal study illustrates strong association between the use of reminder tools and increasing ART adherence(10). Similarly in south Ethiopia Participants who has no mobile phone were more likely to be none adherent to ART as compared to their counterpart(17).

1.2.4. Nutrition related factors

In Cape Town, South Africa; food insecurity/insufficiency was a threat to adherence (38). Study in Zambia, south and north Ethiopia also revealed that dietary diversity was positively associated with improving treatment adherence (16, 17, 21). In south Ethiopia meal frequency did not showed significant association with non-adherence to ART (17). In north and southern Ethiopia those who had less Body Mass Index (BMI) were non-adherent to ART as compared to with that of with large BMI (16, 17).

1.2.5. Immunological related factors

Systematic review in Cameron and cross sectional study in South Africa showed that those with higher CD4 cell counts had significantly lower non-adherence rates as compared to patients having lower CD4 cell count(20, 33). Similar findings were reported in south and north Ethiopia (16, 17). Controversial to the above in Yirgalem

Hospital patients who had high CD4 counts were more likely at risk of non-adherence to ART than those who had less CD4 count (22).

Among the most commonly identified factors for ART non-adherence are, duration on ART, opportunity infection, adverse effect of ART, dietary diversity, BMI, CD4 cell count, social support, alcohol consumption, depression symptom, and availability of reminder were factors associated with non-adherence to ART (5, 13, 15-17). But duration on ART between studies in Ethiopia (Debreworkos and Yirgalem hospitals) (Asmare et al., 2014, Irano et al., 2015) and Nepal (19) and CD4 count between South and North Ethiopia (16, 17) and Yirgalem Hospital (Irano et al., 2015) were showed controversial association with ART adherence status.

Conceptual framework

Based on the different literatures reviewed (5, 6, 15-17, 31, 39) the following conceptual framework was adopted.

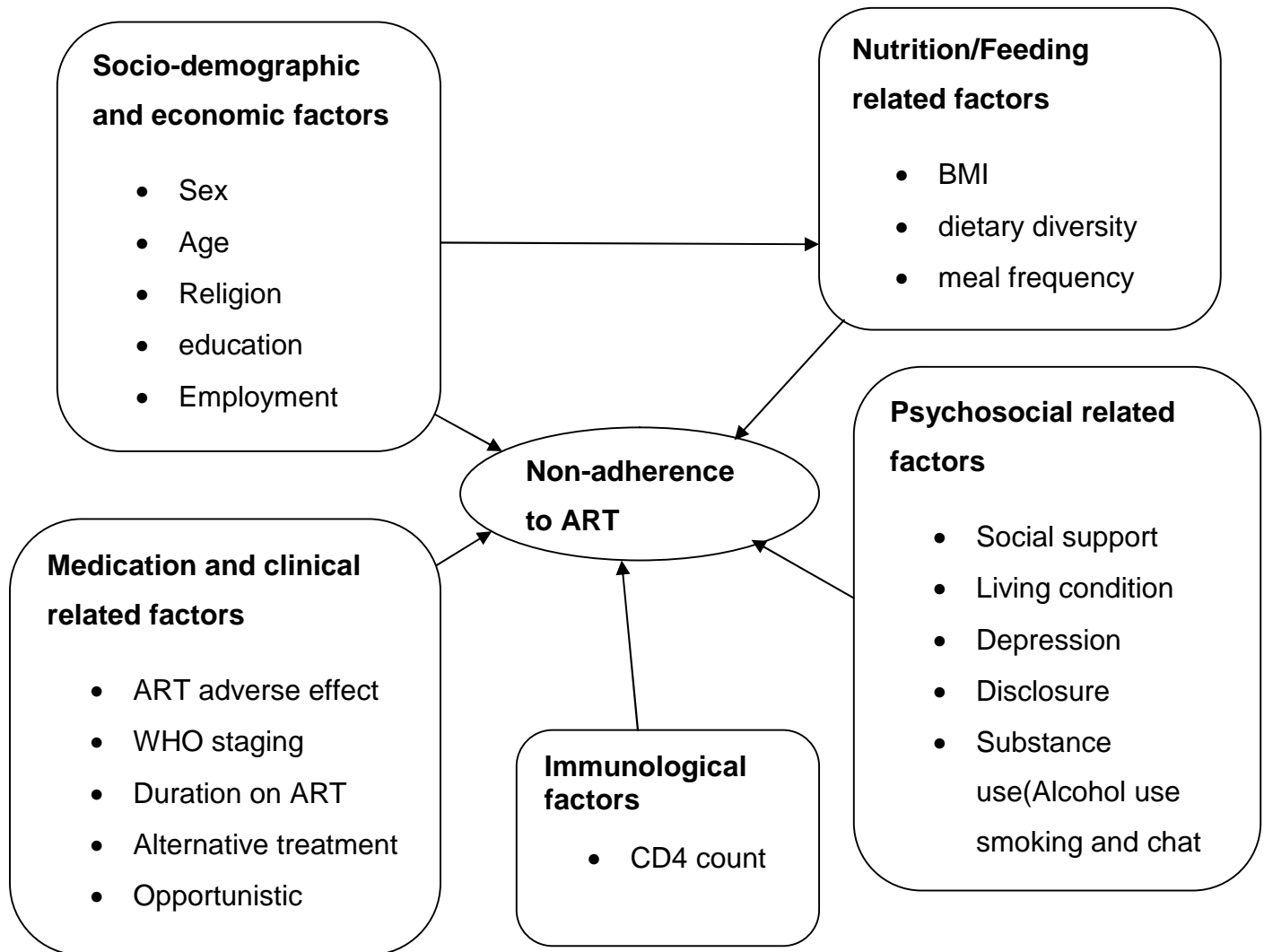


Figure 1: Conceptual framework for determinants of non-adherence to antiretroviral therapy among HIV- Infected adults in Aksum town health facilities, Ethiopia 2015

1.3. Justification of the study

Human immune deficiency virus poses a unique challenge due to its rapid replication and mutation rates. Despite antiretroviral medications control HIV virus replication or multiplication, successful HIV therapy requires adherence greater than 95% to achieve long term suppression of viral load(6). However taking ART medicines life-long treatment is one of the biggest challenges and non-adherence remains a major concern due to different factors. Adherence is a dynamic process on which adherence status changes over time and is influenced by multiple factors.

Controversial association of variables with adherence status was reported (duration on ART between studies in Ethiopia (Asmare et al., 2014, Irano et al., 2015)) and Nepal (Wasti et al., 2012) and CD4 count between studies in south and north Ethiopia (Bitew et al., 2014, Berhe et al., 2013) and in Yirgalem Hospital (Irano et al., 2015)).

In Tigray Region as well as Aksum town, little is known on factors associated with non-adherence to ART and since adherence is not stable, evidence based information is needed to identify site specific determinants of non-adherence to ART and to plan effective intervention strategies. Therefore this study could help to identify determinant of non adherence to ART in Aksum town health facilities and can be used for planning interventions to maximize long-term adherence for clients on ART.

2. OBJECTIVE OF THE STUDY

The objective of the study was to identify determinants of non-adherence to Antiretroviral Therapy among HIV infected adults on ART in Aksum town.

3. METHODS

3.1. Study design and period

An Institution based unmatched case control study was carried out from March 20 to May 15/2015. Non-adherence to ART was considered as case and adherence to ART was taken as control.

3.2. Study setting

The study was conducted in Aksum town health facilities which are found in Aksum town, Tigray Regional State of Ethiopia. Aksum is located 1067 K/m north of Addis Ababa which is the capital City of Ethiopia. The town has a total population of 60706. In Aksum town there are one referral hospital (Aksum St. Marry hospital) and one health center (Aksum health center) that gives ART service. There were 2764 adults ever enrolled to ART (2293 in Aksum St. Marry hospital and 471 in Aksum health center). Currently 1351 HIV infected adults (1143 in Aksum St.Marry hospital and 208 in Aksum health center) are on ART (40).

3.3. Source and study population

Source /study population for cases and controls were all HIV/AIDS positive adults on ART in Aksum town health facilities

3.4. Sample size

The sample size was computed by Epi-Info version7 for un-matched case control study by considering the following assumptions: $\alpha = 5\%$, power = 80%, proportion of controls exposed = (12.1%), proportion of cases exposed =21.7%, OR= 2.18 and case to control ratio= 1:2 (Table1).

Table 1: Sample size determination for factors associated with ART non-adherence

Determinant of non-adherence to ART	% controls exposed	OR	% cases exposed	Case to Control Ratio	Sample size	
					Cases	Controls
CD4 cell count less than 250 cells/mm ³ (17)	12.1	2.18	21.7	1 :2	130	260
Unable to get enough food /Low dietary diversity (16)	46	2.1	68.4	1 :2	95	190
BMI 18.5 kg/m ² (17)	15.3	2.83	14.8	1 :2	61	122

To maximize the sample, by adding 5 % non-response, 137cases and 274 controls final samples were used. Three main variables were used to estimate sample size from previous studies (16, 17). One to two ratio of case to control was taken considering source of cases and controls (because of small number of cases).

3.5. Sampling procedure

From ART follow up charts, all cases that came to ART clinic during data collection period according to their appointment were included in the study and for those who fail to come to health institutions (HI) during their appointment were tried to be traced by phone by their case managers. Controls were selected by using systematic random sampling method. The sampling interval for controls was 4 obtained by dividing the total number of controls to the total sample size of controls. The first participant was selected at random using lottery method from 1, 2, 3 and 4. Then two was selected as a starting point. This method continued until we got 274 controls. Finally data was collected from 137 cases and 274 controls.

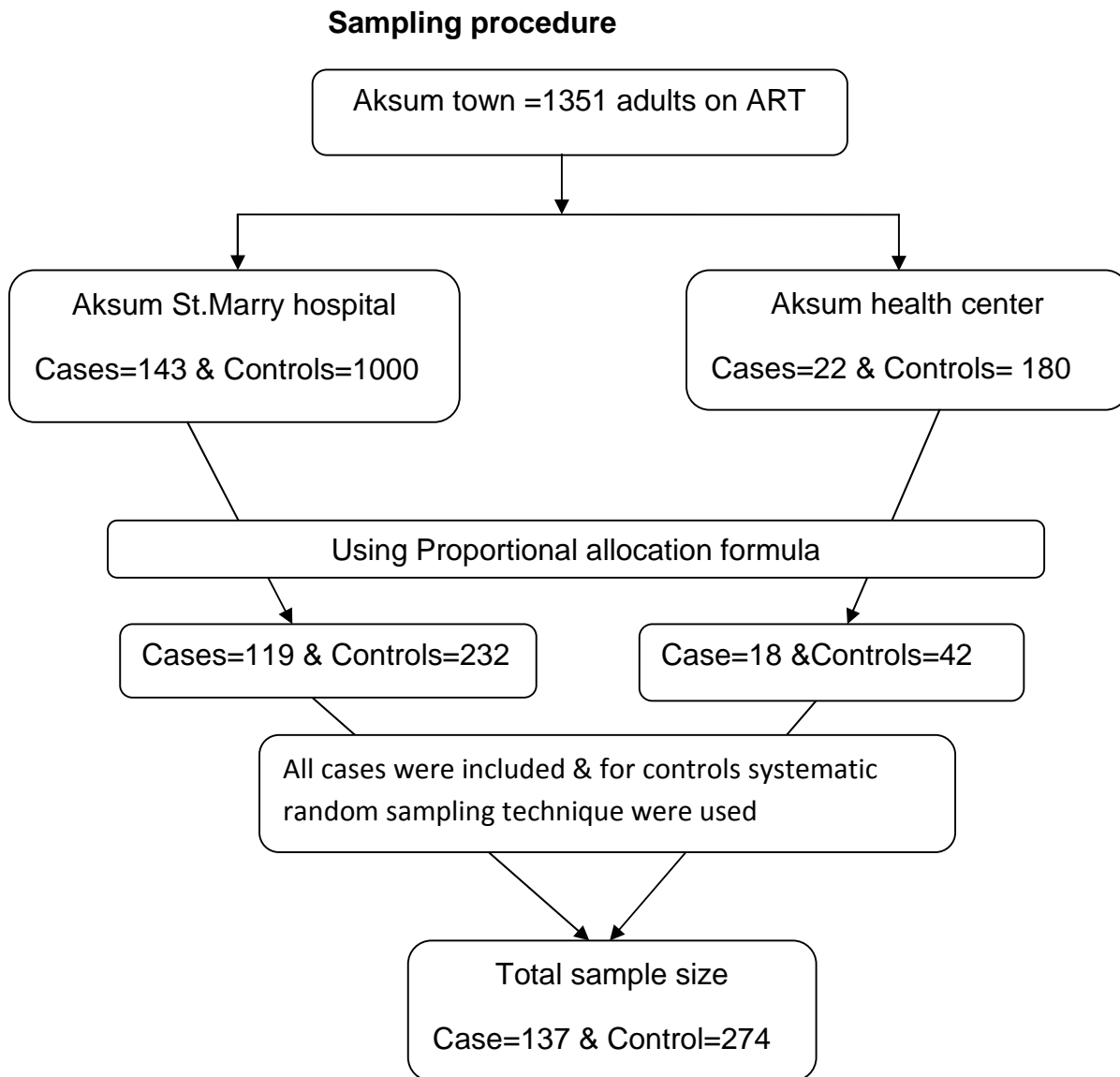


Figure 2: Sampling procedure for selecting adults on ART in Aksum town health facilities, Tigray Regional State, Ethiopia 2015.

3.6. Inclusion criteria

All adults' on ART receiving antiretroviral therapy at Aksum St. Mary's hospital and Aksum health center for six months or more and those with complete data in the individual charts (e.g. CD4 count, WHO staging and ART adverse effect) were included in the study.

3.7. Study variables

Dependent variable: non-adherence to ART

Independent variables includes

Socio-demographic and economic factors: - age, sex, religion, marital status, educational status, occupation, income and residence

Psychosocial factors: - Depression, social support, disclosure of sero-status and substance use (alcohol use, cigarette smoking and chat chewing).

Medication and clinical related factors: - Recent WHO staging, opportunistic infection, ART adverse effect, duration on ART treatment, illegal drug use and use of reminder

Nutrition/feeding related factors: - BMI of the recent last three visits dietary diversity within the last 24 hours and feeding frequency of the last one year.

Immunological factor: - Recent CD4 count of the last three visit

3.8. Operational definition of variables

Non-adherence to ART: The condition of missing doses completely, not following information given by a physician, as well as taking drugs inappropriately. Which means taking doses two or more hours before, and/or two or more hours after the time of a doctor's advice to take doses or missing doses completely (less than 95% adherence = missing >2 doses of 30 doses or >3 doses of 60 doses)(16, 17)

Adherence to ART: - Is defined as taking one's medicine as prescribed and agreed between the patient and provider which is 95% or more adherences to ART. Which means taking doses no more than two hours before or two hours after the time of a doctor's advice to take doses (95% or more adherence = missing 2 doses of 30 doses or 3 doses of 60 doses) (16, 17).

Dietary diversity: The number of reported different foods and food groups consumed in a household over a 24- hour period. This does not include food group

consumed outside home. It is classified as low if ≤ 3 food items consumed, medium if 4-6 food items consumed and high if ≥ 6 food items consumed (41).

Body mass index (BMI): A measure of weight adjusted for height, calculated as weight in kilograms divided by the square of height in meters (kg/m^2). Classified as underweight ($\text{BMI} < 18.5 \text{ kg/m}^2$), normal ($18.5 \leq \text{BMI} < 25 \text{ kg/m}^2$) and overweight or obese ($\text{BMI} \geq 25$) (42).

Depression: Classified by patient health questionnaire (PHQ) with 9-items on which score ranges from 0 to 27, depression was classified as a score of 1 to 4-no depression, 5 to 9 mild depression, 10 to 14 moderate depression, 15 to 19-moderately severe depression and 20 to 27 severe depression, (43).

Social support: If a client had any material/financial, advice/information and social/moral supports from any individual or organization during the last three visits of chronic follow-up.

Living condition: living with parents for clients who live with their mothers and fathers and living with family for clients who live with their spouse and children.

3.9. Data collection procedure

Data was collected by both document review (such as adherence status, sex, CD4 cell count, adverse effect of ART, WHO staging, duration on ART, BMI, opportunistic infection and dose per day) and face to face interview (such as age, residence, marital status, educational status, occupation, reminder use, dietary diversity, eating pattern, depression, stigma, substance use and living condition). A structured and pre-tested questionnaire was developed from different literatures. The questionnaire was first developed in English and translated to the local language Tigrigna (all were Tigrigna speakers) and then translated back to English by different interpreters to check for its consistency. Secondary data were extracted from ART registration follow up charts using data abstraction format. The principal investigator and two BSC nurses as supervisor and two diploma nurses and three case managers as data collectors were participated in the data collection.

3.10. Data quality control

In order to ensure quality of data, pre testing of the questionnaire was done on 21 clients(5% of the total sample size) prior to the actual study on clients on ART in Wukro Maray health center which is 15 K/M from Aksum town and necessary modification was done for the questionnaire according to the gap identified.

One day intensive training was given for data collectors and supervisors on how to approach the clients and how to collect data from ART registration charts. Interview of participants was carried out in private room. Data collection process was strictly followed day to day by the principal investigator and supervisors and the collected data was checked for completeness and consistency every day and any gaps identified were communicated to the data collector. Before analysis, data cleanup and cross check was done.

3.11. Data management and analysis

After the data was checked for its consistency and completeness, it was entered into EPI-INFO version 3.5.1 and was exported to STATA Version 12 for analysis. Data was entered by the principal investigator and was cleaned before analysis. Summary statistics were carried out to describe study participants in relation socio-demographic and economic variables. Continuous variables were summarized using mean and standard deviation (SD). Categorical variables were also presented using proportions and tables.

Both bivariable and multivariable analysis were used to identify determinants of non-adherence to ART among HIV infected adults. Co-linearity diagnostic test was conducted using tolerance to check for co-linearity between independent variables and interaction effect was also checked. Finally factors that showed association in bivariable analysis and which had P-value less than 0.2 were entered in to multiple logistic regression model. Strength of the study was assessed using OR with 95% CI. Model fitness was also checked by using Hosmer–Lemeshow goodness-of-fit test (p-value= 0.9289>0.05 suggests the model fits the data well). At the end adjusted odds ratio with 95% CI and P-value <0.05 was considered as statistically significant.

4. ETHICAL CONSIDERATION

Ethical clearance was obtained from Review Board of institute of public health, collage of Medicine and Health Science, University of Gondar. An official permission letter was obtained from Aksum St.Marry hospital and Aksum health center. During data collection written consent was obtained from each participant after they were introduced the purpose and importance of the study. Participant's involvement in the study was on voluntary basis and they were informed about their rights to interrupt the interview at any time for those who need to stop their participation. To ensure confidentiality, all of the study participants were assured that the data will be anonymous, name or any other personal identifiers will not be recorded and that was done according the consent.

5. RESULTS

5.1. Socio demographic and economic characteristics

One hundred thirty seven non-adherents (cases) and 274 adherents (controls) that were on ART for at least 6 months prior to the study were included in the study. Sixty nine (58.1%) from non-adherents and 170 (62%) from adherents were males and the mean age \pm (SD) of non-adherents and adherents were 37.21 ± 9.95 and 35 ± 8.85 years respectively. Majority, 60 (43.8%) of non-adherents and 127(46.4) adherents' age range were 30-39 years. One hundred fourteen (83.2%) non-adherents and 253(92.3%) adherents were urban residents (table2).

Table 2: Socio demographic and economic characteristics of HIV infected adults on ART in Aksum town health facilities, Tigray Regional State, Ethiopia 2015.

Variables/categories	Adherence status to ART treatment	
	Non-adherent Number (%)	Adherent Number (%)
Sex		
Male	69(50.4)	170(62)
Female	68(49.6)	104(38)
Age		
18-29	23(16.8)	54(19.7)
30-39	60(43.8)	127(46.4)
40-49	35(25.5)	74(27.0)
≥ 50	19(13.9)	19(6.9)
Mean(SD)	37.21(9.95)	35(8.85)
Religion		
Orthodox	127(92.7)	235(85.7)
Muslim	9(6.6)	38(13.9)
Catholic	1(0.7)	1(0.4)
Ethnicity		
Tigray	137(100)	273(99.6)
Amhara	0	1(0.4)

Table 2(Continued): Socio demographic and economic characteristics of HIV infected adults on ART in Aksum town health facilities, Tigray, Ethiopia 2015.

Variables/categories	Adherence status to ART treatment	
	Non-adherent Number (%)	Adherent Number (%)
Marital status		
Single	25(18.2)	47(17.2)
Married	64(46.7)	128(46.7)
Widowed	14(10.2)	32(11.7)
Divorced/separated	34(24.8)	67(24.4)
Residence		
Urban	114 (83.2)	253(92.3)
Rural	23(16.8)	21(7.7)
Educational level		
No formal education	29(21.2)	57(20.8)
Primary education(1-8)	68(49.6)	128(46.7)
Secondary education(9-12)	33(24.1)	69(25.2)
12 ⁺	7(5.1)	20(7.3)
Occupation		
no occupation	21(15.3)	42(15.3)
government employed	25(18.3)	52 (19)
business/self employed	40(29.2)	96(35)
Farmer	14(10.2)	10(3.7)
Daily laborer	37(27)	74(27)
Monthly income in ETB		
<=500	46(33.6)	110(40.2)
501-750	23(16.8)	27(9.8)
751-1000	38(27.7)	66(24.1)
>=1001	30(21.9)	71(25.9)

5.2. Determinants of non-Adherence to antiretroviral therapy

In the bivariable analysis; sex, age, residence, occupation, living condition, substance use, duration on ART, ART adverse effect, depression, dietary diversity, eating pattern, opportunistic infection, treatment other than ART, reminder use, WHO stage, BMI and CD4 count were significantly associated with non-adherence.

During the multivariable analysis duration of treatment, ART adverse effect, substance use, living condition, depression, CD4 cell count and dietary diversity had showed significant association with non-adherence to ART

Those who were on ART for more than two years had 7 times more likely being non-adherence compared to those have been on ART for 6-12 months (AOR=7 and 95% CI=2.2-22.6).

Study participants who experienced ART adverse effect were 6.9 times more likely to be non-adherents compare to those who did not had any adverse effect(AOR=6.9 and 95% CI=1.4-32.9).

Substance use was 5.3 times more likely among non-adherents compared to adherents (AOR=5.3 and 95% CI= 1.4-20.0).

Non-adherence was 3.4 times more likely to occur among those who live with their parents compared to those who live alone (AOR=3.4 and 95%CI = 1.2-10.3).

Those who had depression symptom were 3.3 times more likely to be non-adherent when compared to those who had not depression (AOR=3.3 and 95% CI=1.4-7.5).

The odds of non-adherence was 3.2 times higher among HIV-infected adults with CD4 cell count less than 350 cells/mm³ compared to HIV-infected adults with CD4 cell count greater than or equals to 350 cells/mm³ (AOR=3.2 and 95% CI=1.8-5.8)

Those who eat low dietary diversity had two times higher odds of being non-adherence compared to those who eat medium and above dietary diversity (AOR=2 and 95% CI =1.1-3.7)

Table 3: Determinants of non-adherence to ART among HIV-infected adults at Aksum town health facilities, Tigray Regional State, Ethiopia 2015

Explanatory variables	Adherence status to ART		COR(95%CI)	AOR(95%CI)
	Non-adherent	Adherent		
	Number (%)	Number (%)		
Sex				
Male	69(50.4)	170(62)	1	1
Female	68(49.6)	104(38)	1.6(1.1-2.4)	1.4(0.8-2.4)
Age				
18-29	23(16.8)	54(19.7)	1	1
30-39	60(43.8)	127(46.4)	1.1(0.6-2.0)	1.1(0.5-2.4)
40-49	35(25.5)	74(27)	1.1(0.6-2.1)	0.7(0.3-1.7)
>=50	19(13.9)	19(6.9)	2.3(1.1-5.2)	1.7(0.6-5.0)
Residence				
Urban	114(83.2)	253(92.3)	1	1
Rural	23(16.8)	21(7.7)	2.4(1.3-4.6)	1.4(0.5-4.0)
Occupation				
no occupation	21(15.3)	42(15.3)	1	1
Employed	25 (18.3)	52 (19)	0.9(0.5-2)	1.4(0.5-4.2)
Business	40(29.2)	96(35)	0.8(0.4-1.6)	1.8(0.7-4.0)
Farmer	14(10.2)	10(3.7)	2.8(1.1-7.4)	2.3(0.5-10.3)
Daily laborer	37(27)	74(27)	1(0.5-1.9)	1.9(0.8-4.7)
Duration on ART				
6-12 month	7(5.1)	38(13.9)	1	1
13-24 month	14(10.2)	38 (13.9)	2.0(0.7- 5.5)	2(0.5-8.8)
>=25 month	116(84.7)	198(72.2)	3.2(1.4 7.4)	7(2.2,22.6)**
ART adverse effect				
Yes	26(19)	3(1.1)	21.2(6.3-71.3)	6.9(1.4,32.9)**
No	111(81)	271 (98.9)	1	1

Table 3(Continued): Determinants of non-adherence to ART among HIV-infected adults in Aksum town health facilities, Tigray Regional State Ethiopia 2015.

Explanatory variables	Adherence status to ART		COR(95%CI)	AOR(95%CI)
	Non-adherent Number (%)	Adherent Number (%)		
Substance use				
Yes	21(15.3)	5(1.8)	9.7(3.6-26.5)	5.3(1.4-20.0)**
No	116(84.7)	269(98.2)	1	1
Live with				
Alone	33(24.1)	83(30.3)	1	1
Parents	18(13.1)	21(7.7)	2.2(1.02-4.6)	3.4(1.2-10.3)**
Family	86(62.8)	170(62)	1.3(0.8-2.1)	1.5(0.8-2.8)
Depression status				
Depressed	41(29.9)	19 (6.9)	5.7(3.2-10.4)	3.3(1.4-7.5)**
Not depressed	96(70.1)	255(93.1)	1	1
CD4 cel count				
<350 cells/mm ³	58(42.3)	45 (16.4)	3.7(2.4-6.0)	3.2(1.8-5.8)**
>=350 cells/mm ³	79(57.7)	229 (83.6)	1	1
Dietary diversity				
Low	57(41.6)	43(15.7)	3.8(2.4-6.1)	2(1.1-3.7)**
Medium & above	80(58.4)	231(84.3)	1	1
Daily eating pattern				
<= Two meals	69(50.4)	103(37.6)	1.7(1.1-2.6)	1.01(0.6-1.8)
>=three meals	68(49.6)	171(62.4)	1	1
OI				
Yes	28(20.4)	5(1.8)	13.8(5.2-36.7)	3.6(1-13.1)
No	109(79.6)	269(98.2)	1	1
Reminder use				
Yes	127(92.7)	268(97.8)	0.3(0.1-0.8)	0.5(0.1-2.0)
No	10(7.3)	6(2.2)	1	1

Table 3(Continued): Determinants of non-adherence to ART among HIV-infected adults in Aksum town health facilities, Tigray Regional State Ethiopia 2015.

Explanatory variables	Adherence status to ART		COR(95%CI)	AOR(95%CI)
	Non-adherent	Adherent		
	Number (%)	Number (%)		
Stigma				
Yes	17(12.4)	10(3.6)	3.7(1.7-8.4)	2.8(0.9-8.5)
No	120(87.6)	264(96.4)	1	1
WHO stage				
stage I	16(11.7)	68(24.8)	1	1
stage II& above	121(88.3)	206(75.2)	2.5(1.4-4.5)	1.6(0.8-3.5)
BMI				
Under weight	38(27.7)	41(15)	1	1
Normal	97(70.8)	224(81.7)	0.5(0.3-0.8)	0.7(0.3-1.3)
Over weight	2(1.5)	9(3.3)	0.2(0.1-1.2)	0.4(0.0-3.0)
Treatment other than ART				
Yes	41(29.9)	40(14.6)	2.5(1.5-4.1)	1.4(0.7-3.0)
No	96(70.1)	234(85.4)	1	1

**P – value < 0.05

6. DISCUSSION

One of the foremost concerns of ART programs is the ability of people living with HIV/AIDS to maintain near perfect adherence over the long term. Both patients and health care providers face significant challenges with respect to adherence to ART(6).

In our finding, those who were on ART for more than two years had 7 times higher probability of being non-adherence compared to those have been on ART for 6-12 months and the association was significant. The reason could be due to HIV infected patients on ART for long time may become complacent and find it harder to follow the strict regimen and also it might be because of they were bored of taking the medication. This finding is agreed with studies in Ethiopia (Harari and Yirgalem Hospitals)(14, 22) and Lao PDR(18).The other possible contributing factor in decreased ART adherence over time could be due to family members who had initially played a role in helping patients take their medication might be assumed the client on ART was taking their medication as prescribed and followed up with the client less regularly. But contradicts with the findings in Asia(36) and Nepal(19) which reported patients who have been on ART for short period were more likely to be non-adherent. The possible difference could be due to those studies included study participants with less than 6 months duration on ART and thus HIV infected adults on ART at early phase of treatment may face difficulty of adhering until they familiarize with ART.

Presence of medication adverse effect had statistically significant association with increasing non-adherence to ART. This may be due to the adverse effects and toxicity of the complex ART drugs which could be associated with non-adherence to ART. This is supported by studies in northwest Ethiopia (13) which identified those who had ART adverse effects were non-adherent to ART than that of without adverse effects. As studies reported in Asian developing countries in 2012 ART drugs have toxicities and adverse side-effects that can prevent adherence to ART (35). However the finding of this study is inconsistent with studies done in northwest(5) and Southern Ethiopia (17),Nairobi Kenya(25) and Lao PDR(18), which

showed adverse effect had no significant association with non-adherence to ART. This inconsistency may be due to the difference of study design used.

Non-adherence to ART was significantly associated with substance use. Non-adherence was higher among substance users compared to non users. Some participants may stopped taking medication because they believe that one should not drink alcohol at all (not even incidentally and moderately) while on ART. Hence, since alcohol drinking is common in the study area, they might skip medication even when they drunk a moderate amount of alcohol on a particular occasion. Furthermore, substance use (alcohol use, cigarette smoking and chat chewing) can result into forgetfulness of ART doses. This finding is consistent with studies in southern Ethiopia (17), Tanzania(31) and Nepal(19).

The odd of non-adherence was 3.4 times higher among those who live with their parents compared to that of individuals who live alone and had significant association with facilitating non-adherence to ART. This may be due to the reason that clients may not be comfortable to take ART dose in front of others. Inconsistence to our finding, In Canada individuals living with someone were less non-adherent compared to that of with those who live alone(29). The difference may be due to clients' self-efficacy and attitude towards ART medication.

Having depression symptom was found to be a risk factor for non-adherence to ART and was significant. Consistent with the existing literatures in southwest Ethiopia(15), South Africa(33) and Netherlands(32), the presence of depressive symptoms proved to be a barrier to ART adherence in this study. This finding sheds light on the complexity between the associations of depressive symptoms with ART non-adherence. Another possible explanation could be those clients with depressive symptoms may easily forget taking their dose.

CD4 count less than 350 was 3.2 times more prevalent in the non-adherents compared to the adherents and it had significant association in increasing non-adherence to ART. This might be due to patients with lower CD4 counts and less perceptions of their health are likely to have witnessed less improvement in their

health as a result of commencing ART. This might be facilitated non-adherence to ART. The finding is supported by studies in north Ethiopia(16), South Africa(33) and systematic review in Cameron(20), which showed that high CD4 cell count was associated with decreasing non-adherence to ART. However it is controversial with study done in Yirgalem Hospital, Ethiopia in which participants who had high CD4 counts were more likely at risk of non-adherence to ART than those who had less CD4 count (22). This could be attributed to improvement of health status of the clients on ART, thus making him/her careless and casual in their approach to ART and this reason was supported by studies in Delhi, India (37).

Those who had low dietary diversity were 2 times more likely to be non-adherent compared to those of who had medium and above dietary diversity. The possible explanation could be some patients might have been taught and believed that ART drugs always need to be taken with food and some might have missed the medication as they missed their meal due to the food/dietary insufficiency. This is supported by findings in south and north Ethiopia(16, 17) and Zambia(21).

We found no evidence that sex had a significant influence on ART non-adherence. But cross sectional study in southern Ethiopia(22)and systematic review in Cameroon(20) showed females were less likely at risk of non-adherence to ART than male patients. This may be due to gender gap in access to supportive HIV services, such as targeted counseling and programs for the prevention of mother-to-child HIV transmission offered by antenatal services.

Though this research did not showed significant association between occupation and non-adherence to ART, meta-analysis from each14 developing and developed countries showed patients with HIV infections who were employed were more likely to adhere to ART than those who were unemployed(28). It is possible that employment can facilitates adherence to HIV treatment because it can be associated with improved psychosocial well-being. Employment may also promote increased material well-being by improving food security and housing quality that can be associated with adherence to HIV treatment.

7. LIMITATION

The findings of this study should be interpreted with some limitations. Despite this case control study provides statistical association on factors associated with non-adherence to ART, it cannot establish whether these factors are causative or not.

Some variables (e.g. dietary diversity, meal frequency, depression symptom) were collected by allowing participants freely to recall past events so this self report of past events could have been introduced recall bias.

The use of ART clinic nurses and case managers as data collectors might have been introduced an interviewer bias during interviewing past events.

8. CONCLUSION

In this study long duration on ART (more than two years), experiencing adverse effect of ART, substance use, living with parents, having depression symptom, low CD4 cell count (less than 350 cells/mm³) and low dietary diversity were identified as a risk factors for non-adherence to antiretroviral therapy.

9. RECOMMENDATIONS

For government and policy makers: For those who have food insufficiency, in addition to distributing food supplementation, income generating activities need to be integrated as ART adherence improvement strategies to improve their dietary quality based on local context and to reduce ART non-adherence among PLWHA.

For health care workers: For those PLWHA who stayed on ART for long duration, health care providers have to give much attention to client's situation on following ART because they may be bored of taking medication.

The management of ART adverse effects is a vital part of successful ART adherence. Hence, it is necessary to discuss all potential adverse effects with clients before they begin ART to provide treatment for adverse effects.

Health care providers need to ensure that all clients are exposed to continuous counseling in order to avoid substance use, develop clients' self-efficacy on taking ART in front of others and there should be attempts to improve access to mental health care for those screening positive for depression symptoms.

When clients have lower CD4 counts/mm³, time should be dedicated with every patient to counsel/ educate that they should keep taking their ART medication.

For researchers: Further research preferably longitudinal designs needed to be conducted to understand deeply for factors associated with non-adherence to ART because ART adherence is dynamic and its factors are modifiable from time to time.

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11. ANNEXES

Annex-I Co-linearity diagnostic test between independent variables.

Independent variable	Variance inflation factor VIF	1/VIF
Duration on ART		
6-12 month(reference category)		
13-24 month	2.00	0.50
>=25 month	2.09	0.47
Treatment other than ART	1.30	0.91
Substance use	1.10	0.85
Stigma/discrimination	1.68	0.6
Residence	1.39	0.72
Adverse effect of ART	1.76	0.57
Opportunistic infection	1.73	0.58
Age in years		
18-29(reference category)		
30-39	2.26	0.44
40-49	2.09	0.48
>=50	1.57	0.64
Client lives with		
Alone (reference category)		
Parents	1.37	0.73
Families	1.36	0.73
Eating pattern	1.14	0.88
Dietary diversity	1.25	0.88
WHO staging	1.17	0.86
CD4 count	1.12	0.90
Depression symptom	1.44	0.70
Reminder use	1.13	0.88
Mean VIF	1.59	

Annex - II: Consent form in English language

Institute of Public Health Department of Epidemiology and Biostatistics, collage of Medicine and Health Science, University of Gondar study questionnaire on the determinants of none-adherence to Antiretroviral Therapy among HIV infected adults in Aksum town health facilities, Tigray, Ethiopia, 2015.

Dear madam/sir good morning /good afternoon

My name is _____.I am working as data collector in research project, which is conducted by University of Gondar. The aim of this study is to identify determinants of none-adherence to antiretroviral therapy among adult People Living with HIV/AIDS in Aksum town health facilities, Tigray, Ethiopia. Identifying these factors will help to design and implement an intervention to improve treatment adherence of ART clients to their medication.

Since you are taking ART, I would like to ask you some questions concerning this study. The information you will be giving me will be used only for study purpose and your name, identification number and address are not required. All your personal information will be confidentially treated.

To fill this questionnaire it will take from 15-20 minutes. You have all the right to refuse to answer to any of the questions and withdraw at any time.

If you are interested to participate, will you sign here please?

1. Yes, (if say yes thanks and continue with her)
2. No, (if say no thanks and skip her)

Participant's signature -----

Annex -III: Information sheet in English language

Title of the Research Project: To identify determinants of none-adherence to antiretroviral therapy among adult People Living with HIV/AIDS in Aksum town health facilities, Tigray, Ethiopia, 2015

Name of Principal Investigator: Berhe Beyene

Name of the Organization: University of Gondar College of Medicine and Health Sciences, institute of Public Health Department of Epidemiology and Biostatistics
Information sheet and consent form prepared for persons who are going to participate in this research project.

Introduction

This information sheet and consent form is prepared with the aim of identifying determinants of none-adherence to antiretroviral therapy among adult People on ART. The research group includes the principal investigator, three data collectors, two supervisors, and two advisors from University of Gondar.

Purpose of the Research Project

The aim of this study is to identify determinants of none-adherence to antiretroviral therapy among adult People on ART in Aksum town health facilities, Tigray, Northern Ethiopia, 2015 which is essential to formulate a better new policy strategies and intervention measures. The results of this study will be used to design appropriate intervention programs to address the none-adherence to antiretroviral therapy among adult People on ART during their medication.

Procedure

This study involves adult people on ART. You are randomly selected to be one of the study participants if you are willing to take part in this study; we kindly invite you to take part in our project. If you are willing to participate, we are so happy and we need you to clearly understand the aim of this study and to sign the consent form. Finally you are kindly requested to give your genuine response in the interview questionnaire. You do not need to tell your name to the data collector and all your responses and the results obtained will be kept confidentially by using coding system whereby no one will have access to your responses.

Benefits,

By participating in this research project you may feel some discomfort in wasting your time (a maximum of 20minutes) .However, your participation is definitely important to the level ART utilization and its associated factors so as to design appropriate strategy and intervention to enhance adherence to ART. The result will be disseminated to University of Gondar College of Medicine and Health Science, institute of public health, Tigray Regional Health Bureau and hospitals of Central zone Tigray.

Risk and /or Discomfort; there is no risk or direct benefit in participating in this research project.

Incentives/Payments for Participating

You will not be provided any incentives or payment to take part in this project.

Confidentiality

The information collected from you will be kept confidential and stored in a file, without your name by assigning a code number to it. And it will not be revealed to anyone except the principal investigator and will be kept locked with key

Right to Refusal or Withdraw

Participating and not participation is the full right participants and they can stop participating in the study at any time. They can also skip any question which they want to respond. They can ask any question which is not clear for them.

Person to contact

This research project will be reviewed and approved by the ethical committee of the University of Gondar. If you have any question you can contact any of the following individuals and you may ask at any time you want.

- a) Name: Berhe Beyene: Telephone: +2519 10893579
- b) Professor Yigzaw Kebede (MD, MPH, Telephone +251 913 99 79 33
- c) Mr.Yalemzewod Assefa (MPH): Telephone +251911568477

Annex- IV. Consent form

I have been informed that the purpose of this study is to identify determinant factors of non-adherence to ART among adults on ART. I have understood that participation in this study is entirely voluntarily. I have been told that my answers to the questions will not be given to anyone else and no reports of this study ever identify me in any way. I have also been informed that my participation or non-participation or my refusal to answer questions will have no effect on me. I understood that participation in this study does not involve risks.

Respondent's signature_____

If no, skip to the next participant

Date of interview: _____ Time started: _____, Time finished: _____

Interviewer

Name_____Signature_____Date_____

Supervisor's name _____ signature _____

Annex –V: Structured English version questionnaire

University of Gondar College of Medicine and Health Science, Institute of Public Health questionnaire on determinant factors of non adherence to ART among adults on ART in Aksum town health facilities, Tigray, Ethiopia, 2015

Section I: Questions on socio-demographic and economical factors			
No,	Questions	Coding categories	Skip
101	Sex	1,male 2,female	
102	Age in years	-----	
103	Religion	1,Orthodox 2,Muslim 3,Other specify-----	
104	Ethnicity	1,Tigray 2,Amhara 3,Oromo 4, Other specify -----	
105	Residence	1,Urban 2,Rural	

106	Marital status	1,single 2,Married 3,Widowed 4,Divorced 5,separated	
107	Educational status	-----	
108	Distance from health facility in K/m	-----	
109	Occupation type	1,no occupation 2,government employed 3,busnes/self employed 4.farmer 5,Daily laborer 6,other -----	
110	Monthly income in ETB	-----	
Section II: Questions on nutrition related factors			
111	During the previous 24 hours period (yesterday and night)did you consume the following?(circle all that you apply)		
	<ul style="list-style-type: none"> 1. Any bread, rice noodles, biscuits, or any other foods made from millet, sorghum, maize, rice, etc? 2. Enjera made from whole grains like wheat, sorghum, teff, corn etc? 3. Any vegetables, any meat like beef, chicken, liver, kidney, heart, or other organ? 4. Any eggs? 5. Any fresh or dried fish or shellfish? 6. Any foods made from beans, peas, lentil, or nuts, any cheese, yogurt, milk, or other milk products? 7. Ay foods made with oil, fat, or butter? 8. Any sugar or honey? 9. Any other foods, such as condiments coffee, or tea? 		
112	Daily eating pattern of last 12 months <ul style="list-style-type: none"> 1. Three meals & above 2. Two meals & eating between meals 3. Two meals or less 		

	Section III: Questions on medication related factors		
113	For how long have you been on ART?	1. ,6-12 months 2. 13-24 months 3. >=24 months	
114	How many times did you take your medication per day?	1. Once 2. Twice 3. Three times 4. Four times	
115	Are there are any other medications that you are taking?	1. Yes 2. No	if no skip to Q 117
116	If yes to question 115, what types of medications are taking?	1. Traditional 2. Modern	
117	Methods to remember drug medication time	1.mobile, 2.watch 3.Televsion, 4.Gusing	

125	Reasons for missing doses	1. Toxicity-Side effect 2. Shared with others 3. Simply forget 4. Felt better/Too ill 6. Poor interaction with health care provider 7. Drug out of stock(health facility) 8. Patient run out of stock/lost them 9. Alcohol 10. Fasting 11. Start other treatment 12. Away from home 13. Too many pills 14. Long waiting time 15. Missed appointment 16. Stigma/discrimination 17. Others specify-----	
Section IV: Questions on psychosocial factors			
118	Whit him do you live?	1. Live alone 2. With my parents 3. With family 4. Unstable 5. Other specify -----	
119	Have your partner tasted for HIV	1.Yes 2.No 3.Do not know	
120	your partner HIV status	1.Negative 2.positive 3.Do not know	
121	Do you disclose your HIV status to your partner?	1. Yes 2. No	

122	Do you disclose your HIV status to others?	1.Yes 2.No	
123	Do you have any emotional and practical support?	1. Yes 2. No	If no skip to Q126
124	If yes to question 123, who supports you?	1. Family 2. friends/peers 3. home based care providers / community 4. health care providers 5. mother to mother support group	
125	What type of support do you get from your supporters?	1. material/financial 2. information/advice 3. social/moral 4. others specify	
126	Do you have history of active substance use currently?	1.Yes 2.No	If no skip to Q 126
127	If yes to question 126 which substance do you use?	1.alcohol 2.cigarette 3.chat 4.Others specify-----	
128	How often do you use alcohol?	1. Every day 2. Nearly every day 3. 3 to 4 times a week 4. 2 times a week 5. Once a week 6. 2 to 3 times a month 7. Once a month	
129	Do you smoke cigarette currently (within 30 days)?	1. Yes 2. No	
130	Do you feel you are excluded from any social	1. Yes	

	gathering (weeding, funeral, party and community association group)?	2. No				
131	Over the last two weeks how often have you been bothered by any of the following problems?(CIRCLE ONE NUMBER ON EACH LINE)	Not at all	Several days	More than half the days	Nearly every day	
	1.Little interest or pleasure in doing things	0	1	2	3	
	2.Feeling down, depressed or hopeless	0	1	2	3	
	3.Trouble falling or staying asleep or sleeping too much	0	1	2	3	
	4.Feeling tired, or having little energy	0	1	2	3	
	5.Poor appetite or overeating	0	1	2	3	
	6.Trouble concentrating on things	0	1	2	3	
	7.Feeling bad about myself	0	1	2	3	
	8.Moving or speaking so slowly that other people could have noticed	0	1	2	3	
	9.Thoughts that I would be better off dead ,or of hurting myself	0	1	2	3	
Total score						

THANK YOU! I have finished my interview if you have any question on ART?

Section V: Factors from ART follow up charts of the last three visits among adults on ART in Aksum town health facilities, Tigray, Ethiopia, 2015

S.N	Factors included in ART follow up form	Last three visits
1	Adherence status	
2	Duration on ART	
3	Side effect/write all that apply	
4	Reasons for stopping regimen/ write all that apply	
5	symptom screen/ write all that apply	
6	Opportunistic infection/ symptom	1, 2,
7	Dispense dose/regimen	
8	WHO staging	
9	CD4 cell count in cells/mm ³	
9	Therapeutic /supplementary feeding	1,yes 2,no
10	BMI(kg/m ²	
11	HGB(mg/dl)	

ANNEX-VI: መብርሂ ቅድመ መሕትት

ጎንደር ዩኒቨርሲቲ ኮሌጅ ሕክምናን ጥዕና ሳይንስን ክፍሊ ትምህርቲ ኢፒደሚዮሎጂያ ኤንድ ባዮስታስቲክስ መፅናዕቲ ምስ ፀረ ኤች አይቪ መድሓኒት ዘይምውሳድ ዝተተሓሓዙ ተዛመድቲ ጉዳያት ኣብ ማእከላይ ዞባ

ሰላም- ከመይ ውዲለን/ኩም

እነ ሽመይ-----ይባሃል፡፡ ኣብዚ ዕለት እዚ ኣብዚ ዝተረከብኩሉ ምክንያት ኣብ ፀረ ኤች አይቪ መድሓኒት ምውሳድን ተዛመድቲ ጉዳያትን ሓበሬታ ንምእካብ እዩ፡፡ ዕንፃዩ ዝካየድ ብኣቶ በርህ በየን እንትኸውን ኣብ ጎንደር ዩኒቨርሲቲ ኢፒደሚዮሎጂያ ኤንድ ባዮስታስቲክስ ክፍሊ ትምህርቲ ናይ ካልኣይ ዲግሪ ተምሃራይ እዩ፡፡

ዕላማ ናይዚ መፅናዕቲ ኣብ ከተማ ኣክሱም ጥዕና ድርጅታት ዝርከቡ/ባ ምስ ፀረ ኤች አይቪ መድሓኒት ብኣግባቡ ዘይምውሳድ ዝተተሓሓዙ ተዛመድቲ ጉዳያት ንምፍታሽ እዩ፡፡ ኣብዚ መፅናዕቲ ንክትሳተፉ/ፉን ትክክለኛ ሓበሬታ ክትህቡ/ቡን ብትሕትና ይሓትት፡፡ ናትክን/ኩም ምትሕብባርን ድሌትን ኣብዚ ዝግበር መፅናዕቲ ኣብ ፀረ ኤች አይቪ መድሓኒት ብኣግባቡ ዘይምውሳድን ተዛመድቲ ጉዳያትን ዘለዉ ፀገማት ንምፍላይ ኣዝዩ ጠቓሚ እዩ፡፡ እዚ መፅናዕቲ ብቃለ መሕትት ዝካየድ ኮይኑ ንኣስታት 15 -20 ደቂቓ ግዜክን/ኩም መስዋእቲ ንክትገብሩ/ሩለይ ይላቦ፡፡

እዚ መጠይቅ ዝምላእ ብዝሰልጠነ ሓታታይ ክኸውን ከሎ ኣብ ኩሉ ከይዲ ምምላእን ሓበሬታታት ምስጢሩ ዝተሓለወ ምኻኑ ከረጋግፅ ይፈቱ፡፡ ናይ ውልቀ ሰባት መልሲ ዝተሓዘ ብዝወሃብ ኮድ ቁፅሪ ክኸውን ከሎ ናይ ውልቀ ሰብ ሽም ይኹን ኣድራሻ ኣይተሓዘን፡፡ ውፅኢት እውን ዝግለፅ ብጥቅሉል እምበር ናይ ውልቀ ሰባት ዝግለፅ ኣይኮነን፡፡

እዚ ቃለ መሕትት ብድሌት ጥራሕ ዝግበር እዩ፡፡ ስለዚ ኣብዚ ሕቶን መልስን ብምስታፍክን/ኩም ኮነ ብዘይምስታፍክን/ኩም ኣብ ቀፃሊ ንባዕልክን/ኩም ይኩን ኣብ ስድራክን ኣብ ዘድልዩክን/ኩም ኣገልግሎት ዝፈጥሮ ምንም ዓይነት ዕዕንቶ ክምዘየለ የረጋግፅ፡፡ ኣብ ዝቀርብ ሕቶ ጥርጣረ እንተሓዲሩዎን/ኩም ኣብ ዝኮነ እዋን ናይ ምቁራፅ መሰለን/ኩም ዝተሓለወ እዩ፡፡ ነዚ መፅናዕቲ ዝምልከት ሕቶ እንተለወገ/ም ወይ ድማ ናይዚ መፅናዕቲ ውፅኢት ክፈልግ/ጡ እንተደልየንዮም ከይተሰከፉ/ፉ ንበዓል ዋና እዚ መፅናዕቲ ብዝስዕብ ኣድራሻ ምጥያቕ ይክእላ/ሉ እየን/ዮም፡፡

ኣድራሻ በዓል ዋና መፅናዕቲ

በርህ በየን ቁፅሪ ሞባይል- 251 910893579, ኢ. መይል: berhebeyene2005@gmail.com

1. እው----- ናብ ዝቅፅል ገፅ ቀፅል/ሊ.
2. ኣይፋለይን-----ናብ ዝቅፅል ተሳታፊይ ቀፅል/ሊ.

Annex-VII: ሰነድ ብዛዕባ ሓበሬታ መፅናዕቲን መሕተቲ ስምምዕነትን

ምስ ፀረ ኤች አይቪ መድሓኒት ዘይምውሳድ ዝተተሓሓዙ ተዛመድቲ ጉዳያት ኣብ ከተማ ኣክሱም ጥዕና ድርጅታት ንምፅናዕ ዝተዳለወ ሰነድ ሓበሬታ።

ዋና ፅንዓት መካየዲ፡ በርሀ በየነ

ሽም ትካል፡ ጎንደር ዩንቨርሲቲ ፤ ጎንደር ሕክምናን ጥዕና ሳይንስን ኮሌጅ፤ ሓለዋ ጥዕና ሕብረተሰብ ክፍሊ ትምህርቲ ኢፒደሞሎጂይ ኤንድ ባዮስታስቲክስ

ወፃኢ ዝሸፍን ትካል፡ ጎንደር ዩንቨርሲቲ

መእተዊ፡ እዚ ሓበሬታን መሕተትን ስምምዕነት ሰነድ ንምስታፍ ንሓተሉ መብራህርሂ ሰነድ እዩ። ንምስታፍ ቅድሚ ዝውሳነን በቶም ሓበሬታ አክብቲ ሰነድ ይንበብ። ብፅሞና ብምድማዕ ዘይተረደእን ወይ ግልፂ ዘይኮነ ነገር ቅድሚ ስምምዕነት ተሳትፎ ምጅማር ምሕታት ይካኣል እዩ። ከምኡ ውን ምስታፍ ምስ ጀመራ ግልፂ ዘይኮነ ኣብ ዝኮነ ግዜ ምሕታት ይካኣል እዩ።

ዕላማ መፅናዕቲ፡ ናይዚ መፅናዕቲ ዋና ዕላማ ፅንዓት ምስ ፀረ ኤች አይቪ መድሓኒት ብግቡእ ብዘይምውሳድ ዝተተሓሓዙ ተዛመድቲ ጉዳያት ንምፅናዕ እንትኸውን ዝተፈላለዩ መፍትሒ እቲ ፀገም ንምንፃር ዓብይ እጃም አለዎ። ብተወሳኪ ብዝሓሸ መንገዲ ንምፅናዕ አንፈት ንምምልካት ይሕግዝ። ስለዚ ተሳተፍቲ እዚ መፅናዕቲ ንክትኮኑ/ና ተዓዲሞም/መን አለዎ ። ዕላማ መፅናዕቲ ብምርዳእ ንምስታፍ እንተተሰማዕሚዎም/ዐን፤ ምስምዕምዎም/ዐን ብፅሑፍ ይግለፁ/ባ። ብምቅፃል ሓበሬታ ንምስብሳብ ቃለ ማሕትት ብአክብቲ ሓበሬታ ክካይድ እዩ። ሽሞም/መን ምንጋር አየድልን። መልሶም/ስን ምስጥራዊ እዩ።

ሓደግታት ወይ ድማ ምምችቻው፡ አብዚ መፅናዕቲ ብምስታፎም/ፈን ዘይምምችቻው ክስመዎም/ዐን ይክእል እዩ። ብፍላይ 20 ደቂቃ ዝኣክል ግዜ ክሻመይ ይክእል እዩ። ነገር ግን ፅንዓት ካብ ዝህቦ ጥቅሚ አንፃር ከም ትሳተፉ/ፋ ተስፋ ንገብር። አብዚ መፅናዕቲ ብምስታፎም/ፈን ሓደጋ የብሉን።

ክፍሊት፡ አብዚ መፅናዕቲ ብምስታፎም/ፈን ዝክፈል ክፍሊት የለን።

ምስጥራዊነት፡ ነዚ መፅናዕቲ ዝተአከበ ሓበሬታ ብምስጥር ዝተሓለወ እዩ። እቲ ዝእከብ ሓበሬታ ኣብ ፋይል እንትትሓዝ ሽመካ ምስኡ አይፀሓፍን። ነገር ግን መለለይ ቁፅሪ ክግበረሉ እዩ። እቲ ሓበሬታ ኣብ ናይ ዋና መፅንዒ ፋይል ጥራሕ ተቐሊፉ ስለ ዝቅመጥ ማንም ሰብ ክረክቦ አይክእልን።

መሰል ምቁራጽ ኣብ ከይዲ ቃለ መሕትት፡ አብዚ መፅናእቲ ናይዚምስታፍ ሙሉእ መሰል አለዎም/ወን። ምምላስ ዘይደልይዎም/ኦም ሕቶታት ናይ ዘይ ምምላስ መሰል አለዎም/ወን። ኣብ ዝኮነ ግዜ ናይ ምቁራዕ መሰል አለዎም/ወን። ብዛዕባ እቲ መፅናዕቲ ሓበሬታ ንምሕታት እንተደለዮም/የን ምስ እዞም ዝስዕቡ ሰባት ክራከቡ/ባ ይክእሉ/ላ እየን።

- | | | |
|-------------------|---------|-------------------|
| 1. አቶ በርሀ በየነ | ቁፅሪ ስልኪ | +2519 10893579 |
| 2. ፕሮፌሰር ይግዛው ከበደ | ቁፅሪ ስልኪ | +251 913 99 79 33 |
| 3. አቶ ያለምዘዎድ ኣሰፋ | ቁፅሪ ስልኪ | +251911568477 |

ANNEX- VIII: ናይ ስምምነት ቅጥፒ ቅድመ መፅናዕቲ ሕቶን መልስን

ኣብ ከተማ ኣክሱም ጥዕና ድርጅታት ኣብ ዝርከባ ጥዕና ትካላት ምስ ፀረ ኤች ኦይቪ መድሓኒት ብግቡእ ብዘይምውሳድ ዝተተሓሓዙ ተዛመድቲ ጉዳያት ብዝብል ስያሜ ኣብ ዝካየድ መፅናዕቲ ንምስታፍ ዝተሰማማዕኹ ኮይነ፤ ነዞም ዝስዕቡ ዋኒናት ኣብ ግምት ብምእታው እዩ።

ዕላማ ናይዚ መፅናዕቲ ኣብ ከተማ ኣክሱም ምስ ፀረ ኤች ኦይቪ መድሓኒት ብግቡእ ብዘይምውሳድ ዝተተሓሓዙ ተዛመድቲ ጉዳያት ንምፍታሽ ምኻኑ ብምርዳእ፤ እዚ ቃለ መሕትት ብድሌት ጥራሕ ዝግበርን ምሽጥሩ ዝተሓለወን ምኻኑ ብምእማን ከምኡ ውን ምስታፊይ፤ ዘይምስታፊይ ወይ ምንፃፃይ ኣባይ ምንም ዓይነት ተፅዕኖ ከምዘይብሉ ኣብ ግምት ብምእታው፤ ኢሉ ውን ኣባይ ዘምዕኦ ሳዕቤን ከምዘየለ ብምርዳእ፤ ኣብ መወዳእታ እውን ነዚ

መፅናዕቲ ዝምልከት ሕቶ እንተለኒ ወይ ድማ ናይዚ መፅናዕቲ ውፅኢት ክፈልጥ እንተደልየ ንበዓል ዋና እዚ መፅናዕቲ ኣቶ በርሀ በየነ ኣብ ሳዕሊ ብዝተጠቀሰ ኣድራሻ ምጥያቕ ከምዝክእል ብምእማን ፤ ኣብዚ መፅናዕቲ ንምስታፍ ፍቃደኛ እዮ።

ናይ ተሳታፊይ/ፊት ፊርማ -----

ፍቃደኛ እንድሕር ዘይኮይነን ናብ ዝቅፅል ተሓታታይ ይሕለፉ/ፋ

ዝተሓተተሉ ዕለት-----ዝተጀመረሉ ሰዓት-----ዝተወደአሉ ሰዓት-----

ናይ ሓታታይ ሽም----- ፊርማ-----

ሽም ተቆፃፃሪ----- ፊርማ-----

ውፅኢት ቃለ መሕትት

1. ዝተማልአ 2. ዝተነፀገ 3. ዘይተማለአ

Annex — IX: ናይ ትግርኛ መሕተቲ ፎርም

ኣብ ጎንደር ዩኒቨርሲቲ ጎንደር ሕክምናን ጥዕና ሳይንስን ኮሌጅ ምርምር ማዕከል ሓለዋ ጥዕና ሕብረተሰብ ክፍሊ ትምህርቲ ኢፒደሞሎጂያ ኤንድ ባዮስታስቲክስ ብ 2007 ዓ/ም ኣብ ከተማ ኣክሱም ጥዕና ድርጅታት ምስ ፀረ ኤች ኦይቪ መድሓኒት ብኣግባቡ ብዘይምውሳድ ዝተተሓሓዙ ተዛመድቲ ጉዳያት ንምፅነዕ ዝተዳለወ መሕተቲ

መዘኀኸራ- ካብቶም መማረፅታት ሕረዱ፤ ካሊእ ሓሳብ እንተሃልዩ ኣብቲ ክፍቲ ቦታ ይፀሓፍ

ተ.ቁ	ሕቶታት	መልሲ ክኮኑ ዝክእሉ ኣማረፅታት	ይሕለፉ/ፋ
ክፍሊ.1 ፡ምስ ፀረ ኤች ኦይቪ መድሓኒት ኣጠቓቕማ ዝተተሓሓዙ ሕቶታት			
101	ንክንደይ ዝእክልግዜ ናይ ፀረ ኤች ኦይቪ መድሓኒት-ተጠቂሞም/መን?	1. ካብ 6-12 ወርሒ 2. ካብ 13-24 ወርሒ 3. >=25 ወርሒ	
102	ኣብዚ ሕዚ ግዜ ኣብ መዓልቲ ክንደይ ግዜ ናይ ፀረ ኤች ኦይቪ መድሓኒት ይወስዱ/ዳ ኣለዉ/ዋ?	1. ሓደ ግዜ 2. ክልተግዜ 3. ሰለስተ ንካብኡ ንላዕሊ? 4. ኣይፈልጦን	
103	ካብ ፀረ ኤች ኦይቪ መድሓኒት ወፃኢ ዝጥቀሙዎም/ኦም መድሓኒት ኣለዉ ዶ?	1. እወ 2. የለን	መልሶም የለን እንተኮይኑ ናብ ቁ 105. ይሕለፉ
104	ንቁፅሪ 103 መልሶም/ሰን እወ እንተኮይኑ እነታይ ዓይነት መድሓኒት ይጥቀሙ/ማ?	1. ባህላዊ 2. ዘመናዊ 3. ካሊእ ይገለፅ	
105	መድሓኒት ትወስደሉ ሰዓት ንምስትወስ እንታይ ትጥቀም/ሚ	1. ሞባይል 2. ሰዓት 3. ካሊእ የገለፅ-----	
106	ኣብ ዝሓለፉ 6 ወርሒታት ናይ ፀረ ኤች ኦይቪ መድሓኒት ምውሳዶም ይርስዑ እንተነይሮም ምክንያቱ እንታይ ነይሩ ይብሉ?ካብዞም ዝስዕቡ ምክንያታት ሓደ ወይ ካብ ሓደ ንላዕሊ ምልክት ምግባር ይክእሉ ዕዮም	1. ናይቲ መድሓኒት ጎናዊ ሳዕቤናት 2. ካልኦት ስለ ዝተጠቀሙ ተወዲኡ 3. ረሱኣዮ 4. ፅቡቕ ሰሚዒት ስለዝነበረኒ 5. ብክቢድ ስለዝሓመምኩ 6. ምስጥዕና በዓል ሞያ ስለዘይተሰማዕማዕኩ 7. ኣብ ጥዕና ድርጅት መድሓኒት ስለዘይነበረ 8. መድሓኒት ስለዝወዳእኩ 9. መጠንመድሃኒት ብዘይምፍላጠይ	

		10.ኣልኮል ስለዝሰተኩ 11.ፆም ስለዝኮነ 12.ካሊእ መድሓኒት ስለዝጀመርኩ 13.ካብ ገዛ ሪሒቀ ስለዝነበርኩ 14.መድሓኒት ስለዝበዝሐኒ 15.ምፅባይ ጊዜ ስለዝበዝሐኒ/ኣብ ጥዕና ድርጅት 16.ቆፀሮ ረሲዐዮ 17.ምግላል/ኣድልዎ 18.ካሊእ ይገለፅ-----		
ክፍሊ 2 ብዛዓባ ስርዓተ ምግብ ዝምልከቱ ሕቶታት				
201	ኣብዞም ዝሓለፉ 24 ሰዓታት (ለይቲን መዓልቲን)ኣብዞም ዝስዕቡ ምግብታት ኣየንኦም ተመጊቦም?መልሶም የክብቡ			
	1. ዳቦ,ሩዝ,ብሽኩቲ ወይም ኣልኦት ካብ ጣፍ መሸባሕሪ ወዘተ ዝተሰርሑ ምግብታት 2. ኦትክልቲ 3. ፍራፍሬ 4. ፀብሒ ደርሆ,ስጋ ዝመሳሰሉ ናይ እንስሳት ተዋፅኦ 5. እንቁላሊሕ 6. ናይ ዓሳ ምግብ 7. ካብ ዓተር,ዓተባሕሪ፣ዝመሳሰሉዝተሰርሑ ምግብታት 8. ናይፀባ ተዋፅኦ ከም ርግኦ,ዝመሳሰሉ ምግብታት 9. ብስብሒን ጠስሚንዝተሰርሑ ምግብታት 10. ሽኮር ወይም መዓር 11.ኣልኦት ተወሰክቲ ምግብታት ከም ሻሂ ቡና ዝመሳሰሉ ኣልኦት ምግብታት እንተወሲዶም ይገለፅዎም			
202	ኣብዞም ዝስዕቡ ኣየንኦም እዮም ብዝበለፀ ኣብ ዝሓለፈ ወርሒታት ዝነበረ ናይ ኣመጋግባ ኩነታቶም ዝገልፁ 1. ሰለስተ ጊዜን ካብኡ ንላዕሊን 2. ክልተ ጊዜን ኣብ ማእከል እናሓወስኩ ይበልፅ 3. ክልተን ካብኡ ንታሕቲን			

203	ትማሊ ብሃይማኖት/ሽመሰረት የምካ ዶ ነይርካ/ኪ 2.የለን	1.እወ	
ክፍሊ 3: ስነ-አእምሮን ማሕበረዊን ኩነታት			
301	ምስመን እየም/የን ዝነበሩ/ራ?	1. ንበይነይ 2. ምስወለደይ 3. ምስስድራይ 4. አይተረጋጋዕኩን 5. ካሊእ እንተኮይኑ ይግለፅዎ	
302	በዓል ሓዳርም/ረን ናይ ኤችአይቪ ኤድስ ምርመራ ዶ ገይረን?	1. እወ 2. የለን	ካብ ቁ 302-304 ንበዓል ሓዳር ጥራሕ
303	ናይ በዓል ሓዳርም/ረን ናይ ኤችአይቪ ኤድስ ኩነታት	1.ነጌቲብ 2.ፖዘቲብ 3.አላውቅም	
304	ብዛዕባ ናይ ኤችአይቪ ኤድስ ኩነታቶም/ክን በዓል ሓዳርም/ረን ይፈልጡ/ጣ ዶ?	1. እወ 2. የለን	
305	ብዛዕባ ናይ ኤችአይቪ ኤድስ ኩነታቶም/ክን ካልኣት ሰባት ካብ ቤ/ሰብ ወፃኢ ይፈልጡዶ?	1.እወ 2.የለን 3.አይፈልጥን	
306	ብስነ-አእምሮ ኮነ ብተግባር ዝድግፎም/ፈን አካል ዶ አሎ?	1.እወ 2.የለን	መልሶም የለን እንተኮይኑ ናብ ቁ 309 ይሕለፉ
307	ንሕቶ ቁ 306 መልሶም/ሰን እወ እንተኮይኑ መን እዩ ዝሕግዞም/ን?	1.ቤተሰብ 2.ኣዕርክተይ 2.ዝንገዛ እናዘወሩ ዝሕግዙ ኣካላት ሕ/ሰብ 3.በዓል ሞያ ጥዕና 4.ካሊእ ይግለፅ-----	
308	ካብቶመ ዝሕግዝኩም/ክን ሰባት እንታይ ዓይነት ሓገዝ ይግበረሎም?	1.ናይ ቁሳቁስ/ገንዘብ 2.ናይሃበሬታ/ምክሪ 3.ናይ ማሕበራዊ/ሞራል 4.ካሊእ	
309	ናይ ፀረ ኤች አይቪ ኤድስ መድሓኒት ብምወሳዶም ብረክቡዎ ናይ ኣካላዊ፤ ኢኮኖሚያዊን ስነ-አእምረዊን ጥቅሚ ደስተኛእየኢሎም ይኣምኑ ዶ ?	1.እወ 2.ደስተኛ ኣይኮንኩን 3. አይፈልጥን	
310	ከም ኣልኮል፤ጫትን ሲጋራን ዝመሳሰሉ ነገራት ናይ ምወሳድ ልማድ ኣለዎም ዶ?	1.እወ 2.የለን	መልሶም የለን እንተኮይኑ ናብ ቁ 315 ይሕለፉ

311	ንቆፅራ-310 መልሶም እወ እንተኮይኑ እንታይ ዓይነት ልምዲ ዘትሕዝ ነገር እዮም ዝወስዱ?	1.ኣልኮል 2.ጫት 3. ሲጋራ 4.ካሊእ ይገለፅ ---			
312	ኣልኮል ዝወስዱ እንተኮይኖም መዓዝ መዓዝ የጥቀሙ?	1.በቢመዓልቱ 2.ኣብ ሰሙን ካብ 3-4 መዓልቲ 3.ኣብ ሰሙን 2 ግዜ 4. ኣብ ሰሙን 1 ግዜ			
313	ኣብዚ ወርሒ ወሽጢ ሽጋራ ኣትኪኮም ዶ ነይርም/ረን	1.እወ 2.የለን			
314	ኣብዚ ወርሒ ወሽጢ ጫት ናይ ምቅሓም ልምዒ ዶ ኣለዎም/ን	1.እወ 2.የለን			
315	ካብ ማሕበራዊ መስተጋበርት (ከም መርዓ፣ቀብሪ፣ድግስን እድርን ዝመሳሰሉ)ይገለል ኣለኩ ኢሉምዶ ይኣምኑ?	1. እወ 2. የለን 3. ኣይፈልጥን			
316	ኣብ ዝሓለፉ 2 ሰሙናት ንክንደይ ዝኣክል ግዜ በዞም ዝሰዕቡ ሽግራት ይሓስቡ ወይም ይጭነቁ ነይርም (ኣብዞም ዝስዕቡ ዝኣመንሉ ሓደ ቁፅሪ የክብቡ)	በዚ ሽግር እዚይ ተጠቂፀ ኣይፈልጥን	ብዝሕ ንዝበሉ መዓልቲታ(3-7 መዓልቲታት	ካብ ፍርቂ ንላዕሊ መዓልቲታ	ዳርጋ ኩሉ ግዜ
	ኣብ ዘክናወኛም ነገራት ትሑት ድልየት ወይም ደስተኛ ዘይምኣን ሽግር የጋጥመኒ ነይሩ	0	1	2	3
	ናይ ታሕተዋይነት ስምዒት ወይም ናይ ሰሚዒት ምቅዝቃዝ ወይም ቀቢፀ ተስፋ ይስመኣኒ ነይሩ	0	1	2	3
	እኩል ድቃስ ናይ ዘይምድቃስ ሽግር ወይም ካብ እኩል ንላዕሊ ድቃስ ምብዛሕ	0	1	2	3
	ናይ ድካም ሰምዒት ወይም ንምንቅስቃስ ሓይሊ ምንኣስ	0	1	2	3
	ድኩም ድሌት ምግብ ወይም ካብ እኩል ንላዕሊ ምምጋብ	0	1	2	3
	ስለ ባዕለይ ሕማቅ ስምዒት ይስመዓኒ	0	1	2	3
	ነገራት ብኣትኩሮት ናይ ምክንዋን ሽግር	0	1	2	3
	ካልኤት ሰባት ከስተውዕሉዎ ብዝክእል መልክዑ ብቀሰታ ምንቅስቃስ ወይም ብቀሰታ ምዝራብ	0	1	2	3
	ንባዕልካ ናይ ምጉዳእ ወይም እንተዝሞት ይሕሽ ዝብሉ ሓሳባት ምሕሳብ	0	1	2	3
ክፍሊ 4: ማሕበራዊን ስነ ህዝባዊን ኩነታት					

401	ፆታ	1. ተባዕታይ 2. አንስታይ	
402	ዕድመ	-----	
403	ሃይማኖት	1. ተ/ዶ ኦርቶዶክስ 2. ሙስሊም 3. ካልእ	
404	ብሄለሰብ	1. ትግራይ 2. አምሓራ 3. ካልእ	
405	ዝነብርሉ/ትነብረሉ ቦታ	1. ከተማ 2. ገጠር	
406	ናይ ሓዳር ክነታት	1. ዘይተመርፀወ/ት 2. በዓልሓዳር 3. ዝሞተቶ/ታት 4. ዝፈትሐ/ት 5. ዝተፈላለዩ	
407	ደረጃ ትምህርቲ	-----	
408	ዓሚል ካብ ዝነብርሉ/ትነብረሉ ርሕቀት ትካል ጥዕና	ብኪ/ሜ-----	
409	ሕዚ ዘለዎም/ወን ስራሕ	1. ስራሕ ዘየብሉ/ላ 2. ናይ መንግስቲ ስራሕተኛ 3. ነጋዴ 4. ሓረስታይ 5. መዓልታዊ ስራሕተኛ 6. ካልእ ይግለፅ -----	
410	ወርሓዊ እቶት ብብር	-----	

Annex-XI: Declaration

I the undersigned senior MPH Epidemiology and Biostatistics student declared that this thesis report is my original work in partial fulfillment of the requirement for the degree of Masters of Public Health.

Name: Berhe Beyene

signature_____

Place of submission Institute of Public Health, College of Medicine and Health Science, University of Gondar.

Date of submission _____

This thesis work has been submitted for examination with my/our approval as university of advisor(s).

Advisors

Name	Signature	Date
1. Professor Yigzaw Kebede (MD,MPH,professor)	_____	_____
2. Mr. Yalemzewod Assefa (MPH)	_____	_____